Unit 2 Radical Expressions

9/17/14

2.1 Basics of Radicals

Please work on completing the Unit 1 test for the next 10 minutes.

2.1 Basics of Radicals

9/17/14

Define and identify square roots and principal square roots.

$\sqrt{}$

Perfect Squares

$81 = 9^2$ $\quad \sqrt{81} = \sqrt{9^2} = 9, -9, |9|$

$4 = 2^2$ $\quad \sqrt{4} = 2, -2, |2|$

$36 = 6^2$ $\quad \sqrt{36} = 6, -6, |6|$

Principal Square Root

$\sqrt{9} = 3, -3, |3|$

$\sqrt{49} = 7, -7, |7|$

IWBAT simplify radical expressions, identify equivalent expressions, and simplify products or quotients of radical expressions. I will capture my thinking using the math note catcher including teacher and student-team modeled example problems on the Promethean board. I will demonstrate my understanding on my exit ticket.

2.1 Basics of Radicals

9/17/14

Simplify

If a and b are factors of c, then $\sqrt{c} = \sqrt{a * b}$.

Also, $\sqrt{a * b} = \sqrt{a} * \sqrt{b}$.

5 9
3 15
1 45

$\sqrt{45} = \sqrt{9 \cdot 5} = \sqrt{9} \cdot \sqrt{5} = 3\sqrt{5}$

$= \sqrt{3 \cdot 3} \cdot \sqrt{5}$

2 66
1 2 11
6 22
3 44
4 33

$\sqrt{132} = \sqrt{4} \cdot \sqrt{33} = 2\sqrt{33}$

$\sqrt{12} \cdot \sqrt{11} = \sqrt{4} \cdot \sqrt{3} \cdot \sqrt{11} = 2\sqrt{3 \cdot 11} = 2\sqrt{33}$

IWBAT simplify radical expressions and identify equivalent expressions and simplify products or quotients of radical expressions.

Simplify

Recall $\sqrt{c} = \sqrt{a * b} = \sqrt{a} * \sqrt{b}$.

$\sqrt{3} * \sqrt{12} = \sqrt{36} = 6$

$\sqrt{3} \cdot \sqrt{3} \cdot \sqrt{4} = 3 \cdot 2 = 6$

$\sqrt{2} * \sqrt{3} * \sqrt{6}$

$\sqrt{6} \cdot \sqrt{6} = 6$

$3\sqrt{5} = \sqrt{9} \cdot \sqrt{5} = \sqrt{45} = \sqrt{3} \cdot \sqrt{15}$

IWBAT simplify radical expressions and identify equivalent expressions and simplify products or quotients of radical expressions.

Give equivalent forms.

$\sqrt{3} * \sqrt{15} = \sqrt{45} = \sqrt{9} \cdot \sqrt{5} = 3\sqrt{5}$

$\sqrt{90}$

9 10
6 15
3 30
2 45

$= \sqrt{9} \cdot \sqrt{10} = \sqrt{6} \cdot \sqrt{15} = \sqrt{3} \cdot \sqrt{30} = \sqrt{2} \cdot \sqrt{45}$

$= 3\sqrt{10}$

IWBAT simplify radical expressions and identify equivalent expressions and simplify products or quotients of radical expressions.

2.1 Basics of Radicals

9/17/14

Equivalent Forms

$$\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}$$

$$\frac{\sqrt{4x^2}}{\sqrt{2x}} = \sqrt{\frac{4x^2}{2x}} = \sqrt{2x} = \frac{2x}{\sqrt{2x}} = \frac{\sqrt{2x}\cdot\sqrt{2x}}{\sqrt{2x}}$$

$$\frac{\sqrt{8x^3}}{\sqrt{2x}} = \sqrt{\frac{8x^3}{2x^1}} = \sqrt{\frac{4x^2}{1}} = \sqrt{4x^2} = 2x$$

$$\sqrt{\frac{4\cancel{8}\,x\cdot x\cdot x}{\cancel{2}x\,1}}$$

IWBAT simplify radical expressions and identify equivalent expressions and simplify products or quotients of radical expressions.

2.1 Basics of Radicals

9/17/14

$$\sqrt{c} = \sqrt{a \cdot b} = \sqrt{a} \cdot \sqrt{b}$$

$$\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}$$

Vocabulary 2.1.1 p. 17

Practice 2.1.2

Apex quizzes 2.1.3 & 2.1.4

IWBAT simplify radical expressions and identify equivalent expressions and simplify products or quotients of radical expressions.

2.1 Basics of Radicals

9/18/14

Recall $\sqrt{c} = \sqrt{a * b} = \sqrt{a} * \sqrt{b}.$ $\dfrac{\sqrt{a}}{\sqrt{b}} = \sqrt{\dfrac{a}{b}}$

Practice 2.1.2

$\sqrt{7} \cdot \sqrt{12}$

$\sqrt{3}(4)$

$2\sqrt{3}\sqrt{7}$

$2\sqrt{21}$

$\sqrt{33} \cdot \sqrt{3}$

$\sqrt{11}(\sqrt{3} \cdot \sqrt{3})$

$3\sqrt{11}$

$\sqrt{2} \cdot \sqrt{6} \cdot \sqrt{12}$

$(\sqrt{12} \cdot \sqrt{12})$

12

$\sqrt{12}$

$\sqrt{5} \cdot \sqrt{11} \cdot \sqrt{8}$

$\sqrt{55} \cdot \sqrt{8}$

$\sqrt{55} \cdot \sqrt{(4)} \cdot \sqrt{2}$

$2\sqrt{110}$

$\dfrac{\sqrt{35}}{\sqrt{7}} = \sqrt{\dfrac{35}{7}} = \sqrt{5}$

$\dfrac{\sqrt{30}}{2\sqrt{5}} = \dfrac{\sqrt{30}}{\sqrt{20}} = \sqrt{\dfrac{30}{20}} = \sqrt{\dfrac{3}{2}}$

2.1 Basics of Radicals

9/18/14

$$\frac{\sqrt{38}}{\sqrt{19}} = \sqrt{2}$$

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

$$\sqrt{\frac{5}{2}} \cdot \sqrt{\frac{10}{8}} = \sqrt{\frac{5}{2}} \cdot \sqrt{\frac{5}{4}} = \frac{\sqrt{5} \cdot \sqrt{5}}{\sqrt{2} \cdot \sqrt{4}} = \frac{\sqrt{25}}{2\sqrt{2}} \; 5$$

$$\frac{5}{2\sqrt{2}}$$

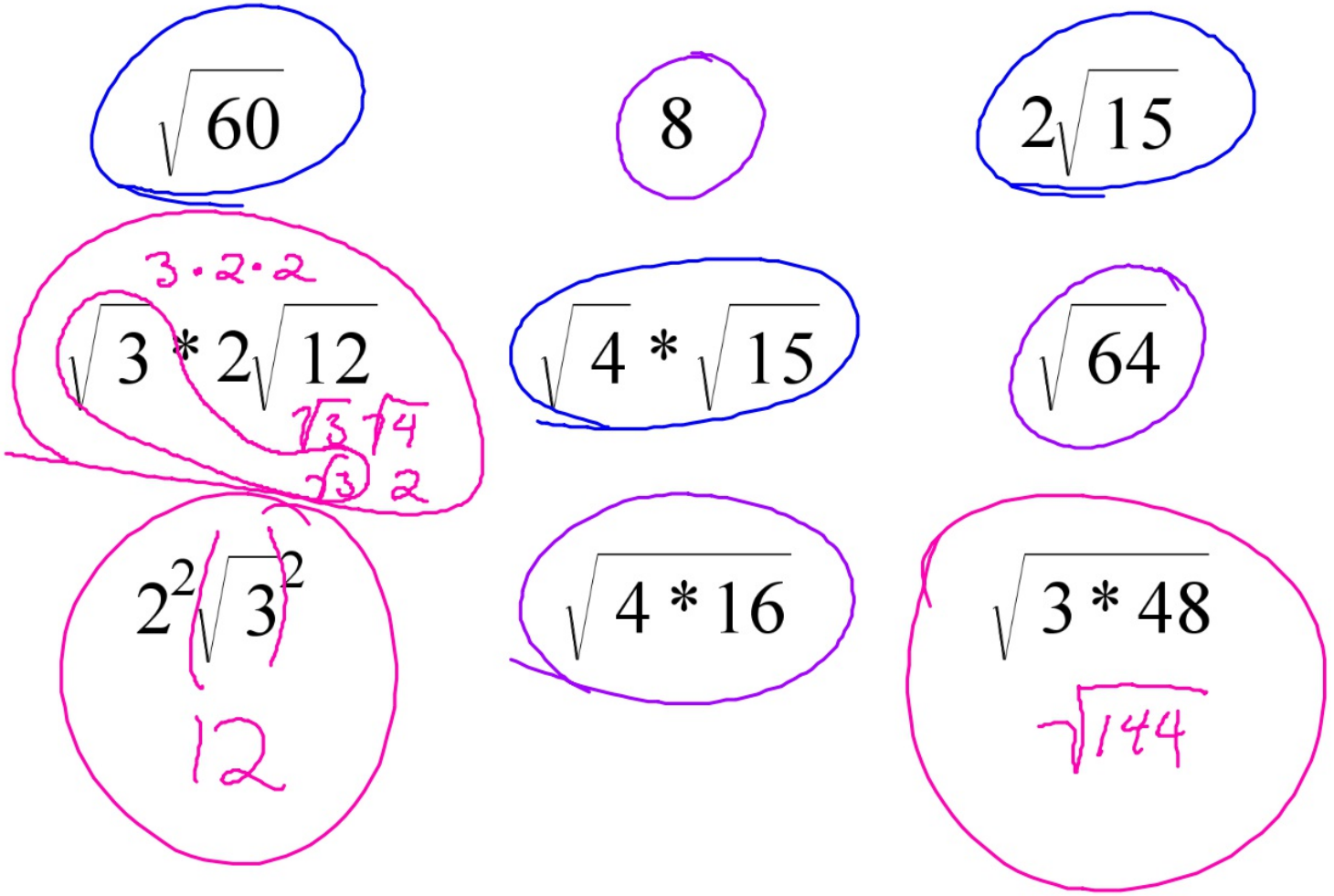
Vocabulary 2.1.1 p. 17

Practice 2.1.2 Apex quizzes 2.1.3 & 2.1.4

2.2 Multiplying & Dividing Radicals

9/19/14

Identify Equivalent radical expressions.



2.2 Multiplying & Dividing Radicals

9/19/14

Identify the inequality that represents the values of x for which a radical expression is defined.

$\sqrt{3x}$ $x \geq 0$

$\frac{1}{\sqrt{5x}}$ $x > 0$

$\sqrt{3x} \div \sqrt{5x}$ $x > 0$

$\frac{\sqrt{3x}}{\sqrt{5x}}$

$= \neq < > \leq \geq$

2.2 Multiplying & Dividing Radicals

9/19/14

Identify the inequality that represents the values of x for which a radical expression is defined.

$\sqrt{x+2}$ $\quad x \geq -2$

$\dfrac{\sqrt{x-1}}{\sqrt{2x-4}}$ $\quad x \geq 1$, $x > 2$

$\sqrt{x+3} \div \sqrt{x^2-9}$

$\dfrac{\sqrt{x+3}}{\sqrt{x^2-9}} = \dfrac{\sqrt{x+3}}{\sqrt{x+3}\cdot\sqrt{x-3}}$ $\quad x \geq -3$, $x > 3$.

IWBAT multiply and divide radical expressions that contain variables, choose equivalent expressions, and use the FOIL method to multiply radical expressions that involve two terms. I will capture my thinking using the math note catcher including teacher and student-team modeled example problems on the Promethean board. I will demonstrate my understanding on my exit ticket.

2.2 Multiplying & Dividing Radicals

9/19/14

Recall $\sqrt{c} = \sqrt{a * b} = \sqrt{a} * \sqrt{b}$ radicand

$\sqrt{3x} * \sqrt{5} =$ $\sqrt{15x}$

$\sqrt{3x} * \sqrt{3} =$ $\sqrt{9x} = 3\sqrt{x}$

$2\sqrt{2x} * 3\sqrt{2x} =$ $6\sqrt{4x^2} = 6 \cdot 2x = 12x$

IWBAT multiply and divide radical expressions that contain variables, and choose equivalent expressions and use the FOIL method to multiply radical expressions that involve two terms.

2.2 Multiplying & Dividing Radicals

9/19/14

$\sqrt{2x} * \sqrt{x+3} = \sqrt{2x^2+6x}$

$\sqrt{x-3} * \sqrt{x+3} = \sqrt{x^2+3x-3x-9} = \sqrt{x^2-9}$

$\sqrt{x-5} * \sqrt{x+8} = \sqrt{x^2+8x-5x-40}$

$\sqrt{x^2+3x-40}$

IWBAT multiply and divide radical expressions that contain variables, and choose equivalent expressions and use the FOIL method to multiply radical expressions that involve two terms.

2.2 Multiplying & Dividing Radicals

9/19/14

Recall $\dfrac{\sqrt{a}}{\sqrt{b}} = \sqrt{\dfrac{a}{b}}$

$\dfrac{\sqrt{4x}}{\sqrt{2x}} =$ $\sqrt{2x}$

$\dfrac{\sqrt{6x^3}}{\sqrt{2x}} =$ $\sqrt{3x^2} = \sqrt{3}\,x = x\sqrt{3}$

$\sqrt{3x^2} \div \sqrt{9x^5} =$ $\dfrac{\sqrt{3x^2}}{\sqrt{9x^5}} = \dfrac{1}{\sqrt{3x^3}} = \dfrac{1}{x\sqrt{3x}}$

IWBAT multiply and divide radical expressions that contain variables, and choose equivalent expressions and use the FOIL method to multiply radical expressions that involve two terms.

2.2 Multiplying & Dividing Radicals

9/22/14

$$\frac{\sqrt{6x-4}}{\sqrt{2x}} = \frac{\sqrt{2(3x-2)}}{\sqrt{2x}} = \frac{\sqrt{3x-2}}{\sqrt{x}}$$

$$\frac{\sqrt{3x+6}}{\sqrt{2x+4}} = \frac{\sqrt{3(x+2)}}{\sqrt{2(x+2)}} = \frac{\sqrt{3}}{\sqrt{2}}$$

$$\sqrt{x-3} \div \sqrt{x^2-9} = \qquad 1 \div \sqrt{x+3}$$

$$\sqrt{x-3} \div \sqrt{(x+3)(x-3)}$$

$$\sqrt{1} \div \sqrt{x+3}$$

IWBAT multiply and divide radical expressions that contain variables, and choose equivalent expressions and use the FOIL method to multiply radical expressions that involve two terms.

Practice 2.2.2

3) $\sqrt{5x^2} \div \sqrt{2x} = \frac{\sqrt{5x^2}}{\sqrt{2x}} = \frac{\sqrt{5x^1}}{\sqrt{2}} = \frac{x\sqrt{5}}{\sqrt{2x}}$

1) $\sqrt{2x} \cdot \sqrt{x+1} = \sqrt{2x^2+2x}$

2) $\sqrt{x-2} \cdot \sqrt{x+3} = \sqrt{x^2+3x-2x-6} = \sqrt{x^2+x-6}$

10) $\sqrt{\frac{x^3}{5}} \cdot \sqrt{\frac{50}{x^3}} = \frac{\sqrt{10}}{1}$

7) $\sqrt{20x^3} \div \sqrt{5x} = \frac{\sqrt{20x^2}}{\sqrt{5x}} = \frac{\sqrt{4x^2}}{\sqrt{1}} = 2x$

2.2 Multiplying & Dividing Radicals

9/22/14

8) $\dfrac{\sqrt{75(x+2)}}{\sqrt{3(x+2)^{21}}} = \dfrac{\sqrt{25}}{\sqrt{(x+2)}} = \dfrac{5}{\sqrt{x+2}}$

Vocabulary 2.2.1 p. 15

Practice 2.2.2

Apex quizzes 2.2.3 & 2.2.4

$\times$ $\div$

IWBAT multiply and divide radical expressions that contain variables, and choose equivalent expressions and use the FOIL method to multiply radical expressions that involve two terms.

2.3 Adding & Subtracting Radicals

9/23/14

Identify the inequality that represents the values of x for which a radical expression is defined. domain

$\sqrt{x-4} \div \sqrt{x^2}$

$x \geq 4$

$x \geq 4$ $\quad$ $x > 0$

$\sqrt{2x+1} \div \sqrt{x+1}$

$x \geq -\frac{1}{2}$

$x \geq -\frac{1}{2}$ $\quad$ $x > -1$

$\sqrt{x^2+1} \div \sqrt{x^2-4}$

$x > 2$

all real numbers $\quad$ $x > 2$

2.3 Adding & Subtracting Radicals

9/23/14

Define "like terms" as the phrase applies to radical expressions.

$$2\sqrt{3} - 3\sqrt{2} + 3\sqrt{2} - 5\sqrt{3}$$

$$2\sqrt{3} + \sqrt{48} - 2\sqrt{5}$$

$= 2\sqrt{3} + 4\sqrt{3} - 2\sqrt{5}$

4 | 12

4 | 3

IWBAT simplify two or more radical expressions so that they have the same radicand, add and subtract radical expressions, and identify equivalent expressions. I will capture my thinking using the math note catcher including teacher and student-team modeled example problems on the Promethean board. I will demonstrate my understanding on my exit ticket.

$2\sqrt{3} - 3\sqrt{2} + 3\sqrt{2} - 5\sqrt{3} = -3\sqrt{3}$

$2x + 4x - 2y = 6x - 2y$

$2\sqrt{3} + \sqrt{48} - 2\sqrt{5} = 2\sqrt{3} + 4\sqrt{3} - 2\sqrt{5}$

$6\sqrt{3} - 2\sqrt{5}$

IWBAT simplify two or more radical expressions so that they have the same radicand and add and subtract radical expressions and identify equivalent expressions.

2.3 Adding & Subtracting Radicals 9/23/14

$$\sqrt{75(x+2)} + \sqrt{3(x+2)} = 5\sqrt{3(x+2)} + \sqrt{3(x+2)}$$

$$6\sqrt{3(x+2)}$$

$$\sqrt{20x^3} - \sqrt{45x^3} = 2\sqrt{5x^3} - 3\sqrt{5x^3}$$

$$-1\sqrt{5x^3} \qquad -x\sqrt{5x}$$

IWBAT simplify two or more radical expressions so that they have the same radicand and add and subtract radical expressions and identify equivalent expressions.

$$\sqrt{x^3} + 5\sqrt{x^3} - 2x\sqrt{x}$$

$6\sqrt{x^3} - 2x\sqrt{x}$

$x \cdot x^2$

$6x\sqrt{x} - 2x\sqrt{x} = 4x\sqrt{x}$

$$2\sqrt{x+2} - \sqrt{4x+8} + \sqrt{9x-18}$$

$2\sqrt{x+2} - \sqrt{4(x+2)} + \sqrt{9(x-2)}$

$2\sqrt{x+2} - 2\sqrt{x+2} + 3\sqrt{x-2}$

$3\sqrt{x-2}$

IWBAT simplify two or more radical expressions so that they have the same radicand and add and subtract radical expressions and identify equivalent expressions.

2.3 Adding & Subtracting Radicals 9/24/14

Vocabulary 2.3.1 p. 8

Practice 2.3.2

Apex quiz 2.3.3

IWBAT simplify two or more radical expressions so that they have the same radicand and add and subtract radical expressions and identify equivalent expressions.

2.4 Rationalizing Denominators

9/25/14

Add and subtract radical expressions.

$2\sqrt{3} + x\sqrt{3} - 3\sqrt{3}$ $= -1\sqrt{3} + x\sqrt{3} = (x-1)\sqrt{3}$

$\sqrt{x+4}$ $x \geq -4$ $\sqrt{4-x}$ $x \leq 4$

$2\sqrt{3} + x\sqrt{3x} + 2x\sqrt{3x}$ $= 2\sqrt{3} + 3x\sqrt{3x}$

$2\sqrt{3} - \sqrt{12} + \sqrt{75}$ $= 2\sqrt{3} - 2\sqrt{3} + 5\sqrt{3}$

$3(4)$ $3(25)$ $= 5\sqrt{3}$

2.4 Rationalizing Denominators

9/25/14

Find the conjugate of an expression.

$a + b$

$a - b$ conjugate

$3 + \sqrt{3}$ $\quad 3 - \sqrt{3}$

$\sqrt{x} - \sqrt{x-1}$ $\quad \sqrt{x} + \sqrt{x-1}$

$\sqrt{3x} + 5$ $\quad \sqrt{3x} - 5$

IWBAT rationalize the denominator of a fraction when the denominator contains one term, identify the fraction needed to rationalize a given fraction that contains one term in the denominator, and rationalize the denominator of a fraction when the denominator contains two terms. I will capture my thinking using the math note catcher including teacher and student-team modeled example problems on the Promethean board. I will demonstrate my understanding on my exit ticket.

2.4 Rationalizing Denominators

9/25/14

$$\frac{5}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{5\sqrt{6}}{6}$$

$$\frac{\sqrt{3}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{6}}{2}$$

$$\frac{7}{\sqrt{2x}} \cdot \frac{\sqrt{2x}}{\sqrt{2x}} = \frac{7\sqrt{2x}}{2x}$$

IWBAT rationalize the denominator of a fraction when the denominator contains one term, identify the fraction needed to rationalize a given fraction that contains one term in the denominator, and rationalize the denominator of a fraction when the denominator contains two terms.

2.4 Rationalizing Denominators

9/25/14

$$\frac{5}{x+\sqrt{6}} \cdot \frac{x-\sqrt{6}}{x-\sqrt{6}} = \frac{5(x-\sqrt{6})}{x^2-6}$$

$$\frac{\sqrt{3}}{\sqrt{2}-x} \cdot \frac{\sqrt{2}+x}{\sqrt{2}+x} = \frac{\sqrt{6}+x\sqrt{3}}{2-x^2}$$

$$\frac{7x}{x-\sqrt{2x}} \cdot \frac{x+\sqrt{2x}}{x+\sqrt{2x}} = \frac{7x^2+7x\sqrt{2x}}{x^2-2x}$$

IWBAT rationalize the denominator of a fraction when the denominator contains one term, identify the fraction needed to rationalize a given fraction that contains one term in the denominator, and rationalize the denominator of a fraction when the denominator contains two terms.

2.4 Rationalizing Denominators

9/25/14

$$\frac{5}{\sqrt{x+2}-\sqrt{x}} \cdot \frac{\sqrt{x+2}+\sqrt{x}}{\sqrt{x+2}+\sqrt{x}} = \frac{5\sqrt{x+2}+5\sqrt{x}}{(x+2)-x} = \frac{5\sqrt{x+2}+5\sqrt{x}}{2}$$

$$\frac{7}{\sqrt{2x}-\sqrt{x-1}} \cdot \frac{\sqrt{2x}+\sqrt{x-1}}{\sqrt{2x}+\sqrt{x-1}} = \frac{7\sqrt{2x}+7\sqrt{x-1}}{2x-1(x-1)} = \frac{7\sqrt{2x}+7\sqrt{x-1}}{x+1}$$

$$\frac{\sqrt{3x}}{\sqrt{2x}-\sqrt{x-1}} \cdot \frac{\sqrt{2x}+\sqrt{x-1}}{\sqrt{2x}+\sqrt{x-1}} = \frac{\sqrt{6x^2}+\sqrt{3x(x-1)}}{2x-(x-1)} = \frac{x\sqrt{6}+\sqrt{3x^2-3x}}{x+1}$$

IWBAT rationalize the denominator of a fraction when the denominator contains one term, identify the fraction needed to rationalize a given fraction that contains one term in the denominator, and rationalize the denominator of a fraction when the denominator contains two terms.

2.4 Rationalizing Denominators 9/25/14

Vocabulary 2.4.1 p. 12

Practice 2.4.2

Apex quiz 2.4.3

IWBAT rationalize the denominator of a fraction when the denominator contains one term, identify the fraction needed to rationalize a given fraction that contains one term in the denominator, and rationalize the denominator of a fraction when the denominator contains two terms.

Find the conjugate of an expression.

$\sqrt{3x}+6$ $\sqrt{3x}-6$

$\sqrt{x}-\sqrt{x-2}$ $\sqrt{x}+\sqrt{x-2}$

$\sqrt{2x+4}-\sqrt{2x}$ $\sqrt{2x+4}+\sqrt{2x}$

Rationalize the denominator of a fraction when the denominator contains two terms.

$$\frac{5}{\sqrt{3x}+6}\cdot\frac{\sqrt{3x}-6}{\sqrt{3x}-6}=\frac{5\sqrt{3x}-30}{3x-36}$$

$$\frac{\sqrt{x}}{\sqrt{x}-\sqrt{x-2}}\cdot\frac{\sqrt{x}+\sqrt{x-2}}{\sqrt{x}+\sqrt{x-2}}=\frac{\sqrt{x^2}+\sqrt{x^2-2x}}{\sqrt{x^2}-(x-2)}=\frac{x+\sqrt{x^2-2x}}{\underbrace{x-x}_{0}+2}$$

$$\frac{x+\sqrt{x^2-2x}}{2}$$

2.5 Solving Radical Equations

9/29/14

IWBAT solve a radical equation by isolating the radical and squaring both sides of the equation to eliminate radicals. I will capture my thinking using the math note catcher including teacher and student-team modeled example problems on the Promethean board. I will demonstrate my understanding on my exit ticket.

2.5 Solving Radical Equations

9/29/14

$\sqrt{x} = 9$ (square both sides)

$x = 81$

$\sqrt{2x} = 8$ (square both sides)

$\frac{2x}{2} = \frac{64}{2}$

$x = 32$

$\sqrt{x+1} = 6$ (square both sides)

$x + 1 = 36$

$-1 \quad -1$

$x = 35$

IWBAT solve a radical equation by isolating the radical and squaring both sides of the equation to eliminate radicals.

2.5 Solving Radical Equations

9/29/14

$$2+\sqrt{2x-5}=7$$

$-2 \quad -2$

$$\left(\sqrt{2x-5}\right)^2 = 5^2$$

$$2x-5=25$$

$+5 \quad +5$

$$\frac{2x}{2}=\frac{30}{2}$$

$$x=15$$

$$\left(\sqrt{x}\right)^2=(x-2)^2$$

C.L.T.

$$x=x^2-4x+4$$

$-x \quad -x$

$$0=x^2-5x+4$$

$$0=(x-4)(x-1)$$

$x=4, 1 \rightarrow$ extraneous

✓

IWBAT solve a radical equation by isolating the radical and squaring both sides of the equation to eliminate radicals.

2.5 Solving Radical Equations

9/30/14

A new clock is being built for the Boxerville clock tower. How many centimeters long must the pendulum be in order for its period to be two seconds?

$$T = 2\pi\sqrt{\frac{L}{980}}$$

$$\frac{2}{2\pi} = \frac{2\pi\sqrt{\frac{L}{980}}}{2\pi}$$

$$\left(\frac{1}{\pi}\right)^2 = \left(\sqrt{\frac{L}{980}}\right)^2$$

$$980 \cdot \left(\frac{1}{\pi}\right)^2 = \frac{L}{980} \cdot 980$$

$$\frac{980}{\pi^2} = L$$

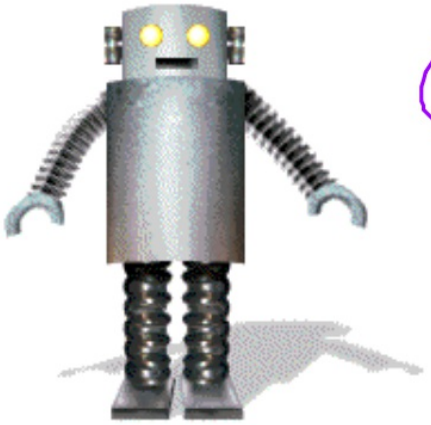
$$L \approx 103 \text{ cm}$$

2.5 Solving Radical Equations

9/30/14

The price of a remote control toy robot is related to its demand (the number that can be sold), as specified by the formula below. How big must the demand be for the price to equal $20?

$$P = 35 - \sqrt{.035x + 3}$$



$20 = 35 - \sqrt{0.035x+3}$

$-35 \quad -35$

$(+1)\ +15^2 = +\sqrt{0.035x+3}^{\,2}\ (+1)$

$225 = 0.035x + 3$

$-3 \qquad -3$

$\frac{222}{0.035} = \frac{0.035x}{0.035}$

$6342.86 = x$

6343 robots

2.5 Solving Radical Equations

9/30/14

Vocabulary 2.5.1 p. 13

Practice 2.5.2

Apex quiz 2.5.3

IWBAT solve a radical equation by isolating the radical and squaring both sides of the equation to eliminate radicals.

Solve the radical equations

$$\sqrt{\frac{5x}{x-6}}^{2} = 2^{2}$$

$$(x-6)\frac{5x}{x-6} = 4(x-6)$$

$$5x = 4x - 24$$

$$-4x \quad -4x$$

$$x = -24$$

$$2 + \sqrt{2x+1} = 11$$

$$-2 \qquad -2$$

$$\sqrt{2x+1}^{2} = 9^{2}$$

$$2x + 1 = 81$$

$$-1 \quad -1$$

$$\frac{2x}{2} = \frac{80}{2}$$

$$x = 40$$

No computers open until the end of class.

IWBAT solve real-world problems using radical equations. I will capture my thinking using the math note catcher including teacher and student-team modeled example problems on the Promethean board. I will demonstrate my understanding on my exit ticket.

Complete Practice 2.6.2

IWBAT solve real-world problems using radical equations.

2.6 Applications of Radical Equations 10/01/14

Vocabulary 2.6.1 p. 12

Practice 2.6.2

Apex quiz 2.6.3

Solve the radical equations

$$\sqrt{3x+13}-12=-5$$

$+12 \quad +12$

$$\left(\sqrt{3x+13}\right)^2=7^2$$

$$3x+13=49$$

$-13 \quad -13$

$$\frac{3x}{3}=\frac{36}{3}$$

$$x=12$$

$$\left(\sqrt{4x+21}\right)^2=(x+4)^2$$

$$4x+21=x^2+8x+16$$

$-4x-21 \quad -4x-21$

$$0=x^2+4x-5$$

$$0=(x+5)(x-1)$$

$$x=-5,1$$

extraneous

2.7 Rational Exponents

10/02/14

Define and identify a rational exponent.

$$\sqrt[n]{x} = x^{\frac{1}{n}}$$

n = index of the radical

$\sqrt[5]{x} = x^{\frac{1}{5}}$ $\sqrt[9]{x} = x^{\frac{1}{9}}$ $\sqrt{x} = x^{\frac{1}{2}}$

IWBAT identify the index of a radical, simplify expressions that contain rational exponents, express a given root as a rational exponent, determine whether a radical expression yields a real number, and convert decimal exponent notation to fractional exponent notation. I will capture my thinking using the math note catcher including teacher and student-team modeled example problems on the Promethean board. I will demonstrate my understanding on my exit ticket.

2.7 Rational Exponents

10/02/14

$$\sqrt[n]{a^m} = \left(\sqrt[n]{a}\right)^m = \left(a^{\frac{1}{n}}\right)^m = \left(a^m\right)^{\frac{1}{n}} = a^{\frac{m}{n}}$$

$\sqrt[n]{x^{3m}} = x^{\frac{3}{5}}$

$\left(\sqrt[7]{x}\right)^3 = x^{\frac{3}{7}}$

$\left(\sqrt[5]{x}\right)^6 = x^{\frac{6}{5}}$

IWBAT identify the index of a radical, simplify expressions that contain rational exponents, express a given root as a rational exponent, determine whether a radical expression yields a real number, and convert decimal exponent notation to fractional exponent notation.

2.7 Rational Exponents

10/02/14

$$\sqrt[n]{a^m} = \left(\sqrt[n]{a}\right)^m = \left(a^{\frac{1}{n}}\right)^m = \left(a^m\right)^{\frac{1}{n}} = a^{\frac{m}{n}}$$

$\sqrt[6]{x^4} = x^{\frac{4}{6}} = x^{\frac{2}{3}}$

$\sqrt[25]{x^7} = x^{\frac{7}{25}}$

$\left(\sqrt{x}\right)^9 = x^{\frac{9}{2}}$

IWBAT identify the index of a radical, simplify expressions that contain rational exponents, express a given root as a rational exponent, determine whether a radical expression yields a real number, and convert decimal exponent notation to fractional exponent notation.

2.7 Rational Exponents

10/02/14

$$\sqrt[n]{a^m} = \left(\sqrt[n]{a}\right)^m = \left(a^{\frac{1}{n}}\right)^m = \left(a^m\right)^{\frac{1}{n}} = a^{\frac{m}{n}}$$

$\left(x^{\frac{1}{3}}\right)^4 = x^{\frac{4}{3}}$

$\left(x^5\right)^{\frac{1}{5}} = x^{\frac{5}{5}} = x$

$\left(x^{\frac{1}{4}}\right)^2 = x^{\frac{2}{4}} = x^{\frac{1}{2}}$

$\left(x^{\frac{1}{2}}\right)^{\frac{2}{3}} = x^{\frac{2}{6}} = x^{\frac{1}{3}}$

IWBAT identify the index of a radical, simplify expressions that contain rational exponents, express a given root as a rational exponent, determine whether a radical expression yields a real number, and convert decimal exponent notation to fractional exponent notation.

2.7 Rational Exponents

10/02/14

Is this root a real number?

$\sqrt[7]{-2}$

$(-1)^{\frac{1}{3}}$ $= -1$

$\sqrt[12]{-81}$

$(-9)^{\frac{1}{4}}$

Imaginary

$\sqrt[12]{-81}$

$(-9)^{\frac{1}{4}}$

even roots

Real

$(-1)^{\frac{1}{3}}$

$\sqrt[7]{-2}$

odd roots

IWBAT identify the index of a radical, simplify expressions that contain rational exponents, express a given root as a rational exponent, determine whether a radical expression yields a real number, and convert decimal exponent notation to fractional exponent notation.

2.7 Rational Exponents

10/02/14

Converting decimal to fractional exponents

$$2^{4.83} = 2^4 * 2^{\frac{8}{10}} * 2^{\frac{3}{100}}$$

$$8^{3.91} = 8^{3} \times 8^{\frac{9}{10}} \times 8^{\frac{1}{100}}$$

$$12^{63.25} = 12^{63} \times 12^{\frac{2}{10}} \times 12^{\frac{5}{100}}$$

$$3^5 * 3^{\frac{7}{10}} * 3^{\frac{2}{100}} = 3^{5.72}$$

HW: Practice 2.7.2

IWBAT identify the index of a radical, simplify expressions that contain rational exponents, express a given root as a rational exponent, determine whether a radical expression yields a real number, and convert decimal exponent notation to fractional exponent notation.

Solve the radical equations

$\sqrt{2x+10}^{2} = x+5^{2}$

$2x+10 = x^2+10x+25$

$-2x-10 = \quad -2x-10$

$0 = x^2+8x+15$

$0 = (x+5)(x+3)$

$x = -5, -3$

Extraneous

$\sqrt{x+3}^{2} = x+3^{2}$

$x+3 = x^2+6x+9$

$-x-3 = \quad -x-3$

$0 = x^2+5x+6$

$(x+2)(x+3)$

$x = -2, -3$

Computers closed to begin class.

2.7 Rational Exponents

10/03/14

Practice 2.7.2

9) $-\left(5^{\frac{2}{1}}\right) = -\left(5^{2}\right) = -25$

5) $8^{\frac{4}{3}} = \left(8^{\frac{1}{3}}\right)^{4} = 2^{4} = 16$

8) $64^{\frac{7}{3}} = \left(64^{\frac{1}{3}}\right)^{7} = 4^{7}$

Computers closed to begin class.

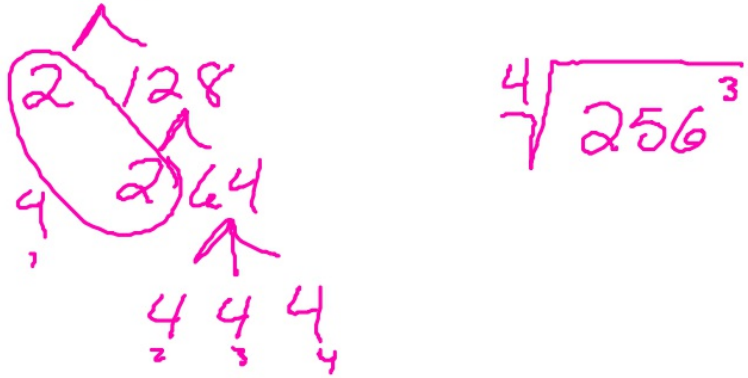
IWBAT identify the index of a radical, simplify expressions that contain rational exponents, express a given root as a rational exponent, determine whether a radical expression yields a real number, and convert decimal exponent notation to fractional exponent notation.

2.7 Rational Exponents

10/03/14

Practice 2.7.2

7) $256^{\frac{3}{4}} = 4^3 = 64$



Computers closed to begin class.

IWBAT identify the index of a radical, simplify expressions that contain rational exponents, express a given root as a rational exponent, determine whether a radical expression yields a real number, and convert decimal exponent notation to fractional exponent notation.

2.7 Rational Exponents

10/03/14

Vocabulary 2.7.1 p. 14

Practice 2.7.2

Apex quizzes 2.7.3 & 2.7.4

IWBAT identify the index of a radical, simplify expressions that contain rational exponents, express a given root as a rational exponent, determine whether a radical expression yields a real number, and convert decimal exponent notation to fractional exponent notation.

2.8 Complex Numbers 10/06/14

Simplify expressions that contain rational exponents.

$\left(36^{\frac{1}{2}}\right)^2$ $36^{\frac{2}{2}} = 36$

$\left(8^4\right)^{\frac{1}{3}}$ $8^{\frac{4}{3}} = 2^4 = 16$

$216^{\frac{2}{3}}$ $= 6^2 = 36$

Computers closed to begin class.

Define the set of complex numbers.

Recall $\sqrt{-1} = i$ is an imaginary number, and that

$$\sqrt{-36} = \sqrt{-1 * 36} = \sqrt{36} * \sqrt{-1} = 6i$$

therefore $6i$ is an imaginary number.

Find: $\sqrt{-49}$ $\sqrt{-169}$

$\sqrt{-1} \cdot \sqrt{49} = 7i$ $13i$

Complex number $(a + bi)$

2.8 Complex Numbers

10/06/14

Define the set of complex numbers.

Complex numbers have a REAL and an IMAGINARY part.

$7+6i$ $\quad -3-2i$ $\quad 23-12i$

$\frac{28+5i}{13}$ $\quad \frac{15}{17}-\frac{12}{17}i$ $\quad -8+i$

This is written generally as a + bi.

$\frac{28}{13}+\frac{5}{13}i$

IWBAT find the sum or difference of complex numbers, rewrite the square root of a negative number as an imaginary number, find the product or quotient of complex numbers, identify the complex conjugate of a complex number, and find the product of a real number and complex number by using the distributive property. I will capture my thinking using the math note catcher including teacher and student-team modeled example problems on the Promethean board. I will demonstrate my understanding on my exit ticket.

Adding complex numbers.

$$(4+6i) + (3+2i) = 7+8i$$

$$(4+3) + (6i+2i) = 7+8i$$

$$(4+6i) - (3+2i) = 1+4i$$

$$(4-3) + (6i-2i) = 1+4i$$

IWBAT find the sum or difference of complex numbers, rewrite the square root of a negative number as an imaginary number, find the product or quotient of complex numbers, identify the complex conjugate of a complex number, and find the product of a real number and complex number by using the distributive property.

$(4-6i)+(12+2i)=$

$(4+12)+(-6i+2i)=16+-4i=16-4i$

$(1+i)-(11-3i)=$

$(1-11)+(i--3i)=-10+\cancel{-4i}+\cancel{+4i}-2i=-10-2i$

$(-2+2i)+(9-5i)=$

$(-2+9)+(2i+-5i)=7+-3i=7-3i$

IWBAT find the sum or difference of complex numbers, rewrite the square root of a negative number as an imaginary number, find the product or quotient of complex numbers, identify the complex conjugate of a complex number, and find the product of a real number and complex number by using the distributive property.

Multiplying complex numbers

Treat the pairs of complex numbers as any binomial and use the FOIL method.

$$(4+3i)*(2+6i) = 8+24i+6i+18i^2$$

Recall that $i = \sqrt{-1}$ therefore $i^2 = \sqrt{-1}^2 = -1$

$$8+24i+6i+18i^2 = 8+24i+6i+18(-1)$$

Combine like terms.

$$(8-18)+(24i+6i) = -10+30i$$

IWBAT find the sum or difference of complex numbers, rewrite the square root of a negative number as an imaginary number, find the product or quotient of complex numbers, identify the complex conjugate of a complex number, and find the product of a real number and complex number by using the distributive property.

$(5+2i)(3-2i) =$ $15 - 10i + 6i - 4i^2$

$-4i + 15 - 4i^2 \quad +15 - 4(-1) = 15+4$

-1

$= 19 - 4i$

$(-2+6i)(4+7i) =$ $-8 - 14i + 24i + 42i^2$

$-8 + 42(-1) = -50 + 10i$

IWBAT find the sum or difference of complex numbers, rewrite the square root of a negative number as an imaginary number, find the product or quotient of complex numbers, identify the complex conjugate of a complex number, and find the product of a real number and complex number by using the distributive property.

Recall that the conjugate of a + b is a - b.

$$e.g.\ \sqrt{x+2}-6 \rightarrow \sqrt{x+2}+6$$

So the conjugate of a complex number a+bi is a-bi.
The pair together are called *complex conjugates*.

Find the conjugate:

$3-2i$ $\quad 3+2i$

$6+2i$ $\quad 6-2i$

IWBAT find the sum or difference of complex numbers, rewrite the square root of a negative number as an imaginary number, find the product or quotient of complex numbers, identify the complex conjugate of a complex number, and find the product of a real number and complex number by using the distributive property.

Dividing complex numbers by multiplying by the complex conjugate of the denominator.

$$\frac{3+2i}{4-i} * \frac{4+i}{4+i} = \frac{12+3i+8i+2i^2}{4^2-i^2} = \frac{10+11i}{17} = \frac{10}{17} + \frac{11}{17}i$$

$$\frac{2-6i}{3-5i} * \frac{3+5i}{3+5i} = \frac{6+10i-18i-30i^2}{3^2-5^2i^2} = \frac{36-8i}{9-25(-1)} = \frac{36-8i}{34} =$$

$$\frac{36}{34} - \frac{8}{34}i = \frac{18}{17} - \frac{4}{17}i$$

IWBAT find the sum or difference of complex numbers, rewrite the square root of a negative number as an imaginary number, find the product or quotient of complex numbers, identify the complex conjugate of a complex number, and find the product of a real number and complex number by using the distributive property.

$$\frac{2+7i}{3-2i}\cdot\frac{3+2i}{3+2i}=\frac{6+4i+21i+14(i^2)}{9-4(i^2)}=\frac{-8+25i}{13}$$

$$-\frac{8}{13}+\frac{25}{13}i$$

$$\frac{6-i}{6+2i}\cdot\frac{6-2i}{6-2i}=\frac{36-12i-6i+2(i^2)}{36-4(i^2)}=\frac{34-18i}{40}$$

$$\frac{34}{40}-\frac{18}{40}i \qquad \frac{17}{20}-\frac{9}{20}i$$

Practice 2.8.2

IWBAT find the sum or difference of complex numbers, rewrite the square root of a negative number as an imaginary number, find the product or quotient of complex numbers, identify the complex conjugate of a complex number, and find the product of a real number and complex number by using the distributive property.

2.8 Complex Numbers

10/07/14

Find the sum or difference of complex numbers.

$(5 + 3i) + (2 - 2i)=$

$(5+2)+(3i-2i)= 7+i$ ~~$= 7-i$~~

$(-5 + 6i) - (4 - i)=$

$(-5-4)+(6i+i)$

$-9+7i$

$(5 + 2i) - (3 - 5i) + (-2 + 4i)=$

$(5-3-2)+(2i+5i+4i)$

$0+11i$

Computers closed to begin class.

IWBAT find the sum or difference of complex numbers, rewrite the square root of a negative number as an imaginary number, find the product or quotient of complex numbers, identify the complex conjugate of a complex number, and find the product of a real number and complex number by using the distributive property.

2.8 Complex Numbers 10/07/14

Practice 2.8.2

8) $\frac{4+6i}{2+4i} \cdot \frac{2-4i}{2-4i} = \frac{8-16i+12i+24(i^2)}{4+16(i^2)}$ $+1$ $+1$

$\frac{32-4i}{20} = \frac{32}{20} - \frac{4}{20}i = \frac{8}{5} - \frac{1}{5}i$

9) $\frac{5-2i}{3-2i} \cdot \frac{3+2i}{3+2i} = \frac{15+10i-6i-4(i^2)}{9-4(i^2)} = \frac{19+4i}{13}$ -1

$\frac{19}{13} + \frac{4}{13}i$

IWBAT find the sum or difference of complex numbers, rewrite the square root of a negative number as an imaginary number, find the product or quotient of complex numbers, identify the complex conjugate of a complex number, and find the product of a real number and complex number by using the distributive property.

2.8 Complex Numbers

10/07/14

Practice 2.8.2

$$\frac{3+i}{5-5i} \cdot \frac{5+5i}{5+5i} \qquad \frac{15+15i+5i+5(-1)}{25+25(-1)}$$

$$\frac{10+20i}{50} \qquad \frac{10}{50}+\frac{20}{50}i$$

$$\frac{1}{5}+\frac{2}{5}i$$

IWBAT find the sum or difference of complex numbers, rewrite the square root of a negative number as an imaginary number, find the product or quotient of complex numbers, identify the complex conjugate of a complex number, and find the product of a real number and complex number by using the distributive property.

2.8 Complex Numbers

10/07/14

Vocabulary 2.8.1 p. 17

Practice 2.8.2

Apex quizzes 2.8.3 & 2.8.4

IWBAT find the sum or difference of complex numbers, rewrite the square root of a negative number as an imaginary number, find the product or quotient of complex numbers, identify the complex conjugate of a complex number, and find the product of a real number and complex number by using the distributive property.

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2.7 Rational Exponents

10/02/14

Converting decimal to fractional exponents

$$2^{4.83} = 2^{4+\frac{8}{10}+\frac{3}{100}} = 2^{4} * 2^{\frac{8}{10}} * 2^{\frac{3}{100}} = 2^{4} * 2^{\frac{4}{5}} * 2^{\frac{3}{100}}$$

$$8^{3.91} = 8^{3} * 8^{\frac{9}{10}} * 8^{\frac{1}{100}}$$

$$12^{63.25} = 12^{63} * 12^{\frac{2}{10}} * 12^{\frac{5}{100}}$$

$$3^{5} * 3^{\frac{7}{10}} * 3^{\frac{2}{100}} = 3^{5.72}$$

HW: Practice 2.7.2

IWBAT identify the index of a radical, simplify expressions that contain rational exponents, express a given root as a rational exponent, determine whether a radical expression yields a real number, and convert decimal exponent notation to fractional exponent notation.

2.9 Performance Task: The skid distance problem 10/08/14

Find the product or quotient of complex numbers.

$(-4 + i)(2 + i) =$ $-8 - 4i + 2i + i^2 = -9 - 2i$

$(-1 + 3i) / (1 + i) =$

$$\frac{-1+3i}{1+i} \cdot \frac{1-i}{1-i} = \frac{-1+i+3i+3(-1)}{1+(-1)} = \frac{2+4i}{2}$$

$$\frac{2}{2} + \frac{4}{2}i = 1 + 2i$$

Computers closed to begin class.

2.9 Performance Task: The skid distance problem 10/08/14

IWBAT show how the length of skid marks left by a vehicle is a real-world application of square root functions and use the skid distance equation to solve for drag factor of various road surfaces, as well as skid mark lengths and original speed of a variety of vehicles. I will capture my thinking using the math note catcher including teacher and student-team modeled example problems on the Promethean board. I will demonstrate my understanding on my exit ticket.

2.9 Performance Task: The skid distance problem 10/08/14

- Pair up,
- Open Apex to 2.9.1 and take notes on how to solve the skid distance problem (~20min),
- Complete Performance Task 2.9.2 together,
- You may ask other teams for assistance, and
- Turn in your work at the end of the period.

IWBAT show how the length of skid marks left by a vehicle is a real-world application of square root functions and use the skid distance equation to solve for drag factor of various road surfaces, as well as skid mark lengths and original speed of a variety of vehicles.

2.9 Performance Task: The skid distance problem 10/09/14

Find the product or quotient of complex numbers.

$(-1 + 3i)(1 + i) =$ $-1 - i + 3i + 3i^2$

$-4 + 2i$

$(-4 + i) / (2 + i) =$

$\frac{-4+i}{2+i} \cdot \frac{2-i}{2-i} = \frac{-8+4i+2i+i^2}{4+1^2} = \frac{-7+6i}{5}$

$\frac{-7}{5} + \frac{6}{5}i$

IWBAT show how the length of skid marks left by a vehicle is a real-world application of square root functions and use the skid distance equation to solve for drag factor of various road surfaces, as well as skid mark lengths and original speed of a variety of vehicles.

2.9 Performance Task: The skid distance problem 10/09/14

- Pair up with yesterday's partner,
- Complete Performance Task 2.9.2 together,
- You may ask other teams for assistance, and
- Turn in your work at the end of the period.

HW: 2.10.1 Practice problems
Unit 2 test tomorrow

IWBAT show how the length of skid marks left by a vehicle is a real-world application of square root functions and use the skid distance equation to solve for drag factor of various road surfaces, as well as skid mark lengths and original speed of a variety of vehicles.

2.10 Radical Expressions and Functions Wrap-up 10/10/14

Find the sum or difference of complex numbers.

$(-1 + 3i) + (1 + i) =$

$-1+1=0$

$3i+i=4i$

$= 4i$

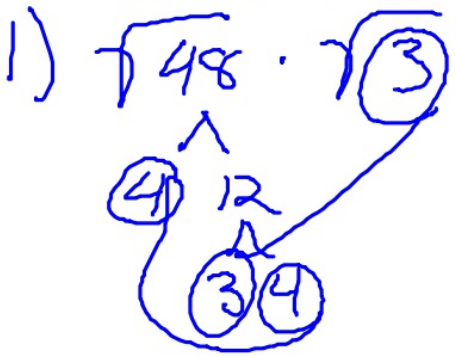
$(-4 + i) - (2 + i) = (-4-2) + (i-i) = -6$

Computers closed to begin class.

2.10 Radical Expressions and Functions Wrap-up 10/10/14

Practice 2.10.1

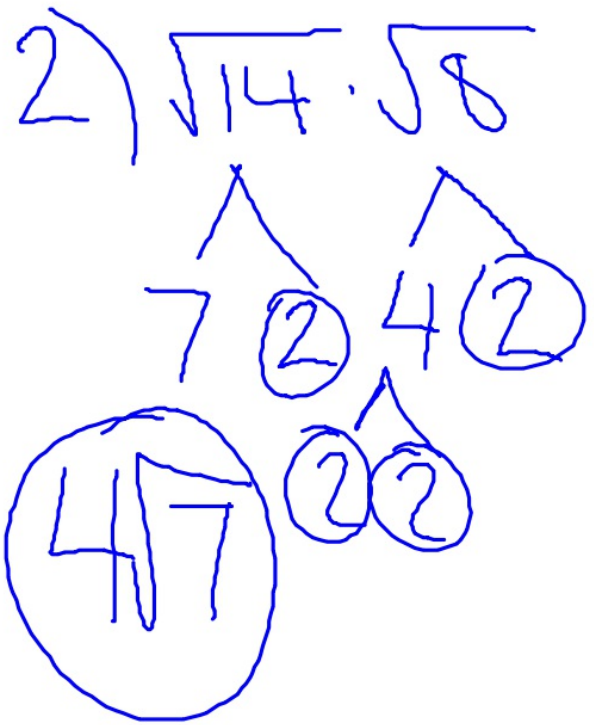
1) $\sqrt{48} \cdot \sqrt{3}$

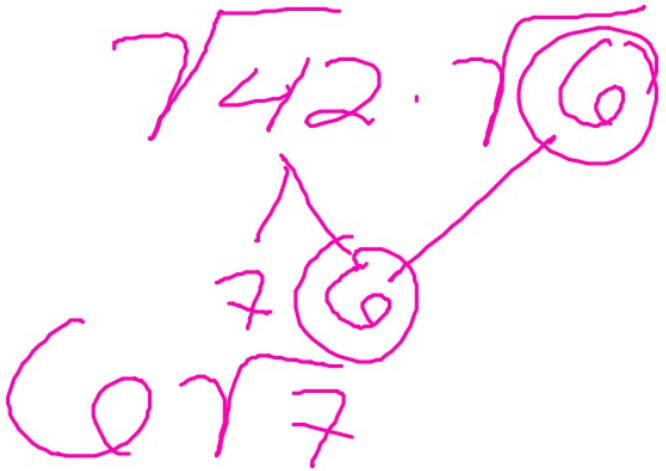


$4 \cdot 3$

$\boxed{12}$

2) $\sqrt{14} \cdot \sqrt{8}$





Computers closed to begin class.

2.10 Radical Expressions and Functions Wrap-up 10/10/14

Practice 2.10.1

5) $\sqrt{8} \cdot \sqrt{2x}$

$4 \quad 2$

$2 \cdot 2\sqrt{x}$

$4\sqrt{x}$

7) $\dfrac{\sqrt{412x + 5\sqrt{5x^2}}}{\sqrt{1,3x}}$

$\dfrac{\sqrt{4x + 5x^2}}{\sqrt{x}}$

$\sqrt{4 + 5x}$

Computers closed to begin class.

2.10 Radical Expressions and Functions Wrap-up 10/10/14

10) $\dfrac{7}{\sqrt{3x}+\sqrt{x-4}} \cdot \dfrac{\sqrt{3x}-\sqrt{x-4}}{\sqrt{3x}-\sqrt{x-4}}$

$\dfrac{7\sqrt{3x}-7\sqrt{x-4}}{\sqrt{9x^2}-(x-4)} = \dfrac{}{3x-x+4} = \dfrac{7(\sqrt{3x}-\sqrt{x-4})}{2x+4}$

12) $\left(\frac{\sqrt{3x}}{\sqrt{2x+3}}\right)^2 = 2^2$

$\cancel{2x+3} \cdot \frac{3x}{\cancel{2x+3}} = 4(2x+3)$

$3x = 8x + 12$

$-8x \quad -8x$

$\frac{-5x}{-5} = \frac{12}{-5}$

$x = -2\frac{2}{5}$

2.10 Radical Expressions and Functions Wrap-up 10/10/14

14) $L = \sqrt{d^2+h^2}$

$8 = \sqrt{d^2+2^2}$

$64 = d^2+4$

$-4 \quad -4$

$\sqrt{60} = \sqrt{d^2}$

$\sqrt{60} = d$

$6 \quad 10$

$3 \quad 2 \quad 5 \quad 2$

$2\sqrt{15} = d$

$\approx 7'9''$

15) $L = \sqrt{d^2+h^2}$

$7 = \sqrt{5.5^2+h^2}$

$49 = 5.5^2+h^2$

$-5.5^2 \quad -5.5^2$

$\sqrt{49-5.5^2} = \sqrt{h^2}$

$\sqrt{49-32.25} = h$

$\sqrt{16.75} = h$

$4.09 = h$

ft

$\approx 4'1''$

2.10 Radical Expressions and Functions Wrap-up 10/10/14

Unit test 2.10.3 (CST)